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Secondary traumatic stress, anxiety, and depression among emergency healthcare workers in the middle of the COVID-19 outbreak: A cross-sectional study

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ABSTRACT

Background: This study aims to determine the secondary traumatic stress (STS), anxiety, and depression levels of the emergency healthcare workers (HCWs) and to identify the factors associated with the mental health of the emergency HCWs.

Methods: This prospective cross-sectional study was performed between April 1 and May 1, 2021. Emergency nurses and auxiliary staff who gave informed consent were included in the study. Participants who answered the questions incompletely were excluded from the study. Demographic information, working and living conditions, STS, anxiety, depression scores, and coping strategies were recorded.

Results: A total of 363 HCWs were included in the study. STS was detected in 261 (71.9%) of the participants, anxiety in 148 (40.8%), and depression in 203 (55.9%) participants. Vaccination against COVID-19 was not associated with STS, anxiety, and depression among emergency HCWs ($p > 0.05$). Having financial difficulties was the most important factor in the development of anxiety, depression, and STS (OR: 3.68 (95% CI 1.96–6.90), $p < 0.001$; OR: 4.36 (95% CI 2.52–7.53), $p < 0.001$; OR: 5.35 (95% CI 3.06–9.37), $p < 0.001$, respectively). We found significantly reduced levels of STS, anxiety, and depression among participants reporting coping strategies that engaging in hobbies, healthy nutrition, and reading books.

Conclusion: High levels of STS, anxiety, and depression were determined among emergency nurses and auxiliary staff during the pandemic. Poor job satisfaction and financial difficulties were associated with the mental health of emergency HCWs. The mental health of the emergency HCWs should be evaluated regularly. In addition to professional psychological support, social and financial support should be provided as well.

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1. Introduction

After pneumonia cases of unknown origin began to appear in December 2019 in Wuhan, China, a new coronavirus subtype (COVID-19) was detected as the causative agent. World Health Organization (WHO) declared a pandemic because of the rapid spread of the virus. [1]. The first confirmed case of COVID-19 in Turkey was identified in the second week of March. Afterward, the entire healthcare system was structured to prioritize COVID-19 patients.

Emergency departments (EDs) were the first presentation areas of patients during the pandemic period, as they were in the pre-pandemic period. The COVID-19 pandemic has brought alongside an increased workload and risk of infection for emergency healthcare workers (HCWs) [2]. Emergency HCWs' lives and habits have changed with the restrictions and the increase in the number of cases, like

other people. Many HCWs began to live away from their homes and families. Intense working conditions and contact with COVID-19 patients affected the mental health of emergency HCWs as well as their physical health [3–6]. HCWs working on the front lines in the COVID-19 outbreak experience more psychological health problems than those working in other fields [7,8].

Secondary traumatic stress (STS) has been defined as natural feelings and behaviors caused by knowing about the traumatic situation experienced by another person [9,10]. Emergency HCWs are at risk for STS because they deal with traumatized or suffering patients due to the nature of their jobs [11]. Frontline HCWs have a higher prevalence of STS than those working in other units during the COVID-19 outbreak [8].

More than a year has passed since the onset of the COVID-19 pandemic. We are now better equipped both in terms of knowledge and equipment compared to the early times of the pandemic. In addition, with the success of the vaccination trials, all countries started to

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vaccinate their citizens. The first vaccination program in Turkey started on January 14, 2021. The first vaccines were administered to HCWs and in a short time, many HCWs were vaccinated.

There are studies in the literature discussing the impact of the pandemic on the psychology of emergency nurses and physicians. However, most of them were before and during the initial period of the COVID-19 outbreak. Studies on the sequent period when the COVID-19 epidemic began to be brought under control and when we have more knowledge about the COVID-19 virus are limited. In addition, studies involving emergency auxiliary staff who are responsible for patient care and transfer, and in close contact with patients are also limited.

This study aims to determine the secondary traumatic stress, anxiety, and depression levels of emergency nurses and auxiliary staff who have been working on the front line more than a year during the COVID-19 outbreak and to identify the factors associated with the mental health of the emergency HCWs.

2. Material and methods

2.1. Study design and participants

This prospective cross-sectional study was performed between April 1 and May 1, 2021, after local ethics committee approval (Approval ID: 2021/131). Emergency nurses and emergency auxiliary staff who gave informed consent were included in the study. Participants who answered the questions incompletely were excluded from the study.

Emergency nurses were responsible for administering the medical treatments of the patients and patient care. The emergency auxiliary staff was responsible for the cleaning of the emergency wards, patient care, and patient transfer.

2.2. Data collection

Study questions were sent to the participants via an online questionnaire to reduce social contact and they were asked to answer all questions. The questionnaire consists of three parts. While the first part included the demographic information, working and living conditions of the participants, the second part included questions to determine the levels of anxiety, depression, and secondary traumatic stress. In the last part, coping strategies with work-related stress were asked. Secondary traumatic stress levels of the participants were determined by the Secondary Traumatic Stress Scale. The anxiety and depression levels of the participants were determined by the Hospital Anxiety and Depression Scale.

2.3. Measures

The Secondary Traumatic Stress Scale (STSS) was developed and validated by Bride et al. in 2004 [12]. The Turkish version of STSS and its validity and reliability study was done by Yıldırım et al. in 2016 [13]. Yıldırım et al. included 334 HCWs in their study, and in the reliability analysis Cronbach's alpha coefficient was 0.91 [13]. Finally, Yıldırım et al. concluded that their Turkish version of STSS was a valid and reliable measurement tool [13]. The Turkish version of the STSS was used to determine the level of STS. There are 17 Likert-type questions scored from 1 to 5 and the total score was between 17 and 85 in the STSS. Participants were asked how often (1: never, 5: very often) they experienced each symptom in the past 7 days. Values of 38 and above were accepted as the presence of STS [12].

The Hospital Anxiety and Depression Scale (HADS) was developed and validated by Zigmond and Snaith in 1983 [14]. The Turkish version of HADS and its validity and reliability study was done by Aydemir et al. in 1997 [15]. Aydemir et al. included 138 patients admitted to internal medicine clinics, and in the reliability analyses, the Cronbach alpha

coefficient for anxiety subscale was 0.85 and for depression subscale was 0.77 [15]. Finally, Aydemir et al. concluded that the Turkish version of HADS is valid and reliable [15]. The Turkish version of HADS was used to determine the anxiety and depression levels of the participants. HADS consists of 14 questions scored from 0 to 3. There are 7 questions for each of the anxiety and depression levels and the total score was between 0 and 21. Cutoff values for anxiety and depression presence were accepted 10 and 7, respectively [15].

2.4. Outcomes

The primary outcomes of the study were STS, anxiety, and depression levels of emergency HCWs.

The secondary outcomes were the factors associated with the STS, anxiety and depression levels of emergency HCWs, and the effects of coping strategies on STS, anxiety, and depression.

2.5. Statistical analysis

When the literature search was done for the power analysis of the study, it was observed that STS was studied among nurses and physicians. Emergency auxiliary staff was not included in STS researches. Due to the sample difference of our study, power analysis could not be performed before the study. Post hoc power was calculated with the emergency HCWs who responded to the questionnaire between April 1 and May 1, 2021. Post hoc power was based on a finding of STS of 64% among 105 emergency department nurses by Duffy et al. [16]. This produced a power of 91% for 363 participants with 71.9% STS prevalence using an alpha of 0.05.

Continuous variables were shown as mean \pm standard deviation and median (interquartile range) values. Categorical variables were shown as numbers and percentages. The distribution of the groups was determined by the Shapiro-Wilks and Kolmogorov Smirnov test. Independent *t*-test or Mann-Whitney *U* test was used to determine the relationship between continuous variables. The relationship between categorical variables was evaluated with the chi-square test. In univariate analysis, variables with a *p*-value less than 0.05, sample size greater than 20, and not correlating with each other were included in the multivariate analysis. Odds ratios were presented with a 95% confidence interval. SPSS for Windows version 23.0 (IBM, Chicago, IL, United States) program was used for statistical analysis. Statistical significance level was accepted as *p* < 0.05.

3. Results

A total of 363 emergency HCWs participated in the study and answered all the questions. The median age of the participants was 27 (IQR: 24–38), and 217 (59.8%) were women. Two hundred and fifty two (69.4%) of the participants were emergency nurses and 111 (30.6%) were emergency auxiliary staff.

STS was detected in 261 (71.9%) of the participants, anxiety in 148 (40.8%), and depression in 203 (55.9%) participants. A total of 253 (69.7%) participants had been vaccinated against COVID-19. Demographic data, anxiety, depression, and STS scores of the participants are shown in Table 1.

Among the participants, those with anxiety were younger (27 (IQR:23–35) vs. 29 (IQR:24–39), *p* = 0.008). There was no significant relationship between age and the presence of depression, and STS. There was no relationship between the participants' years of experience and anxiety, depression, and STS. Similarly, there was no relationship between the presence of comorbid disease, living with an elderly relative, working with COVID-19 patients, receiving training for COVID-19, working night shifts, and the type of institution employed and the presence of anxiety, depression, and STS.

While anxiety was more common in women, it was found to be lower in participants who had children and were vaccinated against

Table 1
Demographic characteristics and anxiety, depression, and secondary traumatic stress levels of the participants

Variables	Values
Female, n (%)	217 (59.8)
Age, median (IQR)	27 (24–38)
Marital status, n (%)	
Single	201 (55.4)
Married	141 (38.8)
Divorced	21 (5.8)
Having kid, n (%)	134 (36.9)
Institution type, n (%)	
University hospital	46 (12.7)
Training and research hospital	162 (44.6)
State hospital	58 (16)
Private hospital	30 (8.3)
Pandemic hospital*	67 (18.5)
Education status, n (%)	
Primary school	24 (6.6)
High school	90 (24.8)
Associate degree	83 (22.9)
Bachelor's degree	151 (41.6)
Master's degree	13 (3.6)
Doctor's degree	2 (0.6)
Occupation, n (%)	
Emergency nurse	252 (69.4)
Emergency auxiliary staff	111 (30.6)
Years of experience, median (IQR)	2 (1–6)
Vaccination against COVID-19, n (%)	253 (69.7)
Anxiety, presence, n (%)	148 (40.8)
Depression, presence, n (%)	203 (55.9)
STS, presence, n (%)	261 (71.9)
Anxiety score, median (IQR)	9 (7–12)
Depression score, median (IQR)	9 (5–11)
STS score, median (IQR)	45 (36–54)

* Where, only COVID-19 suspected or confirmed patients were admitted; IQR: Interquartile range; STS: Secondary traumatic stress.

COVID-19. Anxiety, depression, and STS were significantly higher among those with no job satisfaction, having financial difficulties, and considering changing of career. There wasn't any significant difference between occupations and job satisfaction, having financial difficulties, and considering changing of career ($p = 0.667$, $p = 0.277$, $p = 0.623$, respectively). The factors associated with anxiety, depression, and STS are shown in Table 2.

Table 2
Univariate analyses of the factors associated with anxiety, depression, and secondary traumatic stress

Variables, n (%)	Anxiety*	P**	Depression*	P**	STS*	P**
Gender						
Female	99 (45.6)	0.022	121 (55.8)	0.939	162 (74.7)	0.155
Male	49 (33.6)		82 (56.2)		99 (67.8)	
Having kid/s						
Yes	44 (32.8)	0.019	70 (52.2)	0.279	87 (64.9)	0.024
No	104 (45.4)		133 (58.1)		174 (76.0)	
Occupation						
Nurse	102 (40.5)	0.863	146 (57.9)	0.244	188 (74.6)	0.084
Auxiliary staff	46 (41.4)		57 (51.4)		73 (65.8)	
Vaccination against COVID-19						
Yes	93 (36.8)	0.018	136 (53.8)	0.207	182 (71.9)	0.982
No	55 (50.0)		67 (60.9)		79 (71.8)	
Working with COVID-19 patients						
Yes	136 (42.4)	0.087	182 (56.7)	0.411	234 (72.9)	0.243
No	12 (28.6)		21 (50.0)		27 (64.3)	
Job satisfaction						
Yes	99 (34.6)	<0.001	149 (52.1)	0.005	197 (68.9)	0.014
No	49 (63.6)		54 (70.1)		64 (83.1)	
Financial difficulties						
Yes	132 (48.0)	<0.001	179 (65.1)	<0.001	223 (81.1)	<0.001
No	16 (18.2)		24 (27.3)		38 (43.2)	
Consider change of career						
Yes	92 (56.1)	<0.001	108 (65.9)	0.001	139 (84.8)	<0.001
No	56 (28.1)		95 (47.7)		122 (61.3)	

*Presence; STS: Secondary traumatic stress; ** Chi-square test; $p < 0.05$ considered significant.

We found significantly reduced levels of STS, anxiety, and depression among participants reporting coping strategies of engaging in hobbies, healthy nutrition, and reading books. Exercise and sports were found to be associated with reduced levels of depression and STS. Breathing exercises were associated with reduced levels of anxiety and depression. The relationship between the presence of anxiety, depression, and STS and the coping strategies of the participants is shown in Table 3.

In multivariate analysis, having financial difficulties was the most important factor in the development of anxiety, depression, and STS (OR: 3.68 (95% CI 1.96–6.90), $p < 0.001$; OR: 4.36 (95% CI 2.52–7.53), $p < 0.001$; OR: 5.35 (95% CI 3.06–9.37), $p < 0.001$, respectively). The factors affecting the development of anxiety, depression, and STS are shown in Table 4.

4. Discussion

In our study, STS, anxiety, and depression scores were found to be high among emergency nurses and emergency auxiliary staff. The prevalence of anxiety, depression, and STS was found to be significantly higher among the participants who had low job satisfaction, financial difficulties, and were considering changing careers. Exercise and sports, healthy nutrition, hobbies, and reading books were more common coping strategies among participants who reported lower scores of anxiety, depression, and STS.

In a study conducted on physicians working in the ED in Turkey at the beginning of the COVID-19 pandemic, the prevalence of anxiety was found to be 35.5% and the prevalence of depression to be 62% [17]. In our study, although the occupational groups are different, the anxiety and depression levels of the emergency HCWs (40.8% vs. 55.9%, respectively) are still high. In a study conducted by Orru et al. during the COVID-19 epidemic and including participants from 45 different countries, the prevalence of STS was found to be 47.5% in front-line HCWs, while it was found to be 30.3% in other units [8]. The STS prevalence was found to be 64% and 33% among emergency nurses in the studies of Duffy et al. and Dominguez-Gomez et al. before the COVID-19 pandemic, respectively [16,18]. In our study, the prevalence of STS among the emergency HCW on the front lines was 71.9%. Having financial difficulties and considering career change was associated with higher levels of STS, anxiety, and depression among the emergency HCWs. Although we don't have supporting data, we think working on

Table 3
Effect of coping strategies to anxiety, depression, and secondary traumatic stress

	Anxiety*	p**	Depression*	p**	STS*	p**
Support systems, n (%)						
Co-worker						
Yes	81 (48.5)	0.006	94 (56.3)	0.897	132 (79.0)	0.005
No	67 (34.2)		109 (55.6)		129 (65.8)	
Friends						
Yes	74 (46.8)	0.039	92 (58.2)	0.437	129 (81.6)	<0.001
No	74 (36.1)		111 (54.1)		132 (64.4)	
Family						
Yes	109 (41.9)	0.478	151 (58.1)	0.189	197 (75.8)	0.009
No	39 (37.9)		52 (50.5)		64 (62.1)	
Spiritual/religious leader						
Yes	16 (61.5)	0.025	17 (65.4)	0.313	25 (96.2)	0.004
No	132 (39.2)		186 (55.2)		236 (70.0)	
Stress relief strategies, n (%)						
Hobbies						
Yes	72 (29.4)	<0.001	103 (42.0)	<0.001	153 (62.4)	<0.001
No	76 (64.4)		100 (84.7)		108 (91.5)	
Exercise/Sports						
Yes	31 (34.1)	0.133	33 (36.3)	<0.001	54 (59.3)	0.002
No	117 (43.0)		170 (62.5)		207 (76.1)	
Healthy nutrition						
Yes	37 (25.7)	<0.001	62 (43.1)	<0.001	82 (56.9)	<0.001
No	111 (50.7)		141 (64.4)		179 (81.7)	
Meditation						
Yes	10 (27.8)	0.095	14 (38.9)	0.030	25 (69.4)	0.730
No	138 (42.2)		189 (57.8)		236 (72.2)	
Yoga						
Yes	5 (25.0)	0.140	7 (35.0)	0.053	15 (75.0)	0.751
No	143 (41.7)		196 (57.1)		246 (71.7)	
Breathing exercise						
Yes	24 (30.0)	0.026	36 (45.0)	0.026	58 (72.5)	0.893
No	124 (43.8)		167 (59.0)		203 (71.7)	
Religion						
Yes	119 (42.0)	0.351	163 (57.6)	0.227	206 (72.8)	0.478
No	29 (36.2)		40 (50.0)		55 (68.8)	
Working on a charity						
Yes	13 (40.6)	0.986	20 (62.5)	0.433	28 (87.5)	0.040
No	135 (40.8)		183 (55.3)		233 (70.4)	
Reading books						
Yes	75 (35.2)	0.010	102 (47.9)	<0.001	144 (67.6)	0.030
No	73 (48.7)		101 (67.3)		117 (78.0)	
Academic research						
Yes	21 (26.6)	0.004	37 (46.8)	0.066	53 (67.1)	0.282
No	127 (44.7)		166 (58.5)		208 (73.2)	

*Presence; STS: Secondary traumatic stress; ** Chi-square test; p < 0.05 considered significant.

the frontlines for more than a year and not knowing how long this situation will continue may affect the psychological health of emergency HCWs. Urgent financial and career support is needed for emergency HCWs.

In the study of Orru et al., women achieved higher STS scores than men, but they concluded that there was no difference between genders in terms of the presence of STS [8]. Besirli et al. concluded that nurses experienced more anxiety and depression than other healthcare professionals [19]. Similarly, in the study of Lai et al., nurses and women show more psychological symptoms than other healthcare professionals [7]. On the other hand, in our study, no significant relationship was found between emergency nurses and auxiliary staff in terms of the

development of anxiety, depression, and STS. In this case, it can be said that working in a pandemic situation rather than profession may affect the development of psychological symptoms. In addition, gender has no association with scores of depression and STS in our study. However, similar to the study of Besirli et al., anxiety rates were found to be higher in women than in men (OR: 2.03 (95% CI 1.25–3.30), p = 0.004) [19]. As Rio-Casanova et al. stated in their study, the COVID-19 outbreak may affect women’s mental health more [20].

Lai et al. found that those working in the secondary care hospitals had higher anxiety and depression scores than those working in the tertiary referral hospitals [7]. Trumello et al., found more anxiety, depression, and STS in HCWs working with COVID-19 patients than those

Table 4
Factors affecting the anxiety, depression, and secondary traumatic stress

	Anxiety	p	Depression	p	STS	p
	OR (95% CI)		OR (95% CI)		OR (95% CI)	
Age	0.97 (0.94–1.01)	0.171	1.00 (0.96–1.03)	0.888	1.00 (0.96–1.05)	0.714
Gender, female	2.03 (1.25–3.30)	0.004	1.10 (0.70–1.74)	0.669	1.67 (0.99–2.81)	0.054
Job satisfaction	2.00 (1.11–3.63)	0.021	1.34 (0.73–2.46)	0.342	0.97 (0.46–2.06)	0.950
Financial difficulties	3.68 (1.96–6.90)	<0.001	4.36 (2.52–7.53)	<0.001	5.35 (3.06–9.37)	<0.001
Consider change of career	2.14 (1.29–3.57)	0.003	1.58 (0.95–2.61)	0.074	2.76 (1.51–5.06)	0.001
COVID-19 vaccination	1.55 (0.94–2.56)	0.084	1.19 (0.73–1.96)	0.470	0.83 (0.47–1.46)	0.532

STS: Secondary traumatic stress; OR: Odds ratio; CI: Confidence interval; p < 0.05 considered significant.

not working with COVID-19 patients [21]. However, we concluded that working with a COVID-19 patient and the institution type did not associated with STS, anxiety, and depression. Working in any healthcare institution during the pandemic period, rather than contacting a COVID-19 patient, may have affected the psychology of HCWs. There is a need for studies comparing HCWs and other groups in this regard.

Although the anxiety levels of those who were vaccinated against COVID-19 were found to be low in our study, multivariate analysis showed that the vaccine against COVID-19 did not affect the development of anxiety, depression, and STS. Continuing vaccine studies and disclosing different results regarding the effects and side effects of vaccines may have reduced the confidence in the vaccine. On the other hand, vaccine hesitancy may have affected the psychological symptoms of individuals after vaccination, as in the study of Palgi et al. [22].

In our study, participants who had no job satisfaction, had financial difficulties, and were considering changing careers had higher rates of anxiety, depression, and STS. Wang et al. found poor job satisfaction to be effective in the development of STS [23]. In a study conducted by Tarcan et al., a positive correlation was found between job satisfaction and annual income and household economic well-being [24]. In our study, we found that the most important factor in the development of anxiety, depression, and STS is having financial difficulties. In this case, we can say that being in a good financial standing may affect the psychological health of emergency nurses and auxiliary staff both directly and indirectly (with its effect on job satisfaction). In the studies to be carried out to protect the mental health of HCWs, both financial supports and factors affecting their job satisfaction should be taken into consideration.

From the study of Cai et al., healthcare professionals did not consider a career change at high rates [2]. On the contrary, in our study, the majority of the participants were considering changing careers. The reason for this difference may be that Cai et al.'s study was conducted at the beginning of the COVID-19 pandemic, and our study was conducted approximately 1 year after the first case in our country. Working in pandemic conditions for a long time may have caused a change in the career plans of HCWs. Besides, thinking about changing career may be the result of psychological symptoms rather than the cause.

Additionally, there wasn't any significant difference between occupations and career change plans in our study. Working or experience hours do not affect the career pathway of emergency nurses and auxiliary staff in our country. Therefore, considering changing career was based on individual factors.

Cai et al. found that HCWs received high support from family and friends and that co-workers were an important factor in reducing stress [2]. Similarly, in our study, emergency HCWs received support from family and close friends at high rates. However, we concluded that these support systems are not beneficial for anxiety, depression, and STS. We even found that some of them (colleagues, friends, religious leaders) had unfavorable effects. For this reason, it would be more appropriate for emergency HCWs to receive professional psychological support, especially in circumstances where the stress level is high such as a pandemic.

Munawar et al. recommended reducing media exposure, not sharing COVID-19 shift experience, and getting support from religion to cope with stress [25]. However, our study has shown that activities to protect individual well-being (engaging in hobbies, healthy nutrition, exercise, and breathing exercises etc.) contribute more positively to the psychological health of emergency HCWs than other methods. It would be rational to provide social support as well as psychological support to HCWs.

Despite the increase in our knowledge about the COVID-19, the psychological impact of the COVID-19 epidemic on emergency HCWs continues. Emergency patient care is a teamwork and it should not be forgotten that emergency nurses and emergency auxiliary staff are also part of this team. Preventive and supportive programs that cover all HCWs should be started urgently.

Finally, all of the studies in the literature include our study come from different cohorts, regions, and cultures, and supports that the psychological aspects of the pandemic are probably unique to each population. Each health system should assess the psychological factors in their setting and develop unique strategies to aid their population.

4.1. Limitations

The first limitation of our study is being cross-sectional and taking a snapshot of our emergency HCWs. We included emergency nurses and auxiliary staff and could not comment on all HCWs in the healthcare system. Besides, we could not comment on the difference in STS, anxiety, and depression of HCWs during the pandemic period since we did not have pre-pandemic data of the participants.

5. Conclusions

High levels of STS, anxiety, and depression were determined among emergency nurses and auxiliary staff during the pandemic. Poor job satisfaction and financial difficulties were found to be associated with the psychological health of emergency department workers. Engaging in hobbies, healthy nutrition, exercising, breathing exercises, and reading books are more common coping strategies among participants who reported lower scores of anxiety, depression, and STS. The mental health of the emergency healthcare workers should be evaluated regularly. In addition to professional psychological support, social and financial support should be provided as well.

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Authors contributions

Study concept and design (B.İ., İ.K.), acquisition of the data (B.İ., İ.K.), analysis and interpretation of the data (B.İ., İ.K.), drafting of the manuscript (B.İ., İ.K.), critical revision of the manuscript for important intellectual content (B.İ., İ.K.).

Declaration of Competing Interest

The authors declare that they did not have any potential conflicts of interest with regard to this research, or the authorship and publication of this article.

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